

**Maine Department of Transportation
Research Highlights
July 2000**



Permeability of Superpave Pavements - When Maine DOT adopted the Superpave mix design method for hot mix asphalt one of the primary concerns raised was that these pavements would be significantly more permeable than the dense graded mixes of past. This could lead to premature failure due to asphalt stripping and freeze-thaw damage. As a result a research study was awarded to Dr. Rajib Mallick of Worcester Polytechnic Institute to determine if Maine's Superpave mixes will be prone to permeability problems. Using laboratory and field testing devices on five different Maine DOT projects the permeability was measured. The study concludes that Maine's Superpave pavements do not exhibit excessive permeability. The study also found a very strong relationship between pavement density and permeability, and concludes that our pavement density requirements are sufficient to insure problems with permeability should not occur.



Before/After Study of a Modern Roundabout - The first modern roundabout in Maine was opened to traffic in July 1997. The site in Gorham replaced a non-signalized intersection at the junction of Rt. 237 and Rt. 202. Before/After traffic crash data and delay data was collected and evaluated by Dr. Per Garder of the University of Maine. The one lane design has reduced delay on the minor approaches by approximately 80% during morning and afternoon peak hours. In total, the roundabout has saved 5000 to 10,000 hours of annual delay to its users. That by itself will pay for the construction of the roundabout in about five years. Crash rates were reduced and modeling indicates a significant reduction in crashes compared to a signalized intersection. Because of this success other roundabouts are being planned and/or considered throughout the State of Maine.



Performance of Geosynthetics Beneath Flexible Pavements - The objective of this study is to evaluate the effectiveness of geosynthetics in terms of reinforcement, separation, and drainage for roadways constructed in cold regions where the gravel subbase is thicker than that investigated in previous studies. A portion of Rt. 1A in the towns of Winterport and Frankfort included instrumented test sections of geosynthetics. The weak subgrade soils were requiring areas to be undercut and backfilled with gravel to stabilize the roadway. Geosynthetics placed on this weak subgrade replaced undercutting in some areas thus expediting the construction. Instrumented geogrid showed the majority of the forces being induced during construction. Drainage geocomposites placed at subgrade and 18 inches below subgrade have removed a substantial amount of water during spring thaw. Pavement performance and evaluation of instrumentation readings will continue for five years. Similar experimental projects using a thinner pavement section are planned.



An Evaluation of Winter Maintenance Material and Placement Equipment - An evaluation process was undertaken by Maine DOT in an effort to determine if developing technologies in the winter maintenance field might be viable and cost effective additions to MDOT's current fleet of snow fighting equipment. The process included the evaluation of four different material metering and placement systems over two winters. Data collected in both actual snow and ice conditions and controlled tests indicate a savings in material is possible when utilizing some form of material metering equipment. The material placement systems also showed promise in material savings. This study also included the MDOT's experience with salt as a primary material for treating highways in winter conditions. Data and recommendations from the final report has provided justification for the Maintenance & Operations Bureau to implement a material and placement equipment strategy.